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ABSTRACT

The problem of teacher isolation and lack of collegial relationships has been extensively documented and considered one of the obstacles to improvement of instruction. The study reported here analyzed some empirical evidence about how that situation can change in junior high school science. The study investigated: (1) what happens when science teachers interact with each other on a frequent basis about instructional matters? and (2) what are some of the aspects of the school environment that make such conversation possible and fruitful? The data came from inventories, structured interviews, fieldnotes, transcripts of audiotapes, support teacher logs, meeting agendas and notes, exemplars of student work, and other such sources. It was found that extended interaction of science teachers about instructional matters feeds into the improvement of their practice, motivates experimentation, and allows the transformations in practice to feed back into the conversation. The study findings indicate that teachers' isolation is not impossible to break. There is a need, however, for teacher-based departmental effort and administrative support. (Most of the paper is comprised of a literature review on teacher isolation.)
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CHANGING THE CONVERSATION:

WHEN SCIENCE TEACHERS START TALKING ABOUT INSTRUCTION...

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Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Atlanta, April 8-11, 1990. The research presented has been supported by the Institute for Research on Teaching and grants from the National Science Foundation, the Martha Holden Jennings Foundation, and the Toledo Community Foundation. We also acknowledge the cooperation of the American Federation of Teachers, the Toledo Public Schools and the College of Education at Michigan State University. The opinions expressed in this paper do not necessarily reflect the position, policy, or endorsement of any of the organizations referred above.

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Abstract

The purpose of the study reported here is to investigate: 1) What happens when science teachers interact with each other about instructional matters on a frequent basis and 2) What are some of the aspects of the school environment that make such conversation possible and fruitful.

The problem of teacher isolation and lack of collegial relationships has been extensively documented and considered one of the obstacles to improvement of instruction. The study reported here analyzes some empirical evidence about how that situation can change in junior high school science.

The study is part of a larger collaborative research and intervention project in junior high school science and mathematics. The collaboration is between a research institute, a school district, and a teachers' union was arranged. Four junior high schools in an urban midwestern school district agreed to participate in the project. In each of them the science and mathematics faculty chose on of them to be respectively the Science and the Mathematics Support Teacher. The study only deals with data pertaining to the four science support teachers.

The data from the study come in various forms and from various sources: inventories, structured interviews, fieldnotes, transcripts of audiotapes, support teacher logs, meeting agendas and notes, exemplars of student work like worksheets, tests, write-ups, etc..

The findings are that extended interaction of science teachers about instructional matters feeds into the improvement of their practice, motivates experimentation, and that the transformations feedback into the conversation.

The study findings indicate that teachers' isolation is not impossible to break. There needs to be an at least departmental effort that is based on the teachers and with administrative support.

CHANGING THE CONVERSATION:

WHEN SCIENCE TEACHERS START TALKING ABOUT INSTRUCTION...

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I. TEACHING: AN ISOLATING PROFESSION

> It's a vacuum. It's a vacuum. You come in here and you close the door. And what goes on in here, goes on in here, and it doesn't in any way seem to affect anything that goes on outside the classroom. And I wish it could. I really do (Woman teacher quoted in Freedman et al., n. d.).
>
> It's a lonely profession Bill (1). Even in this school where teachers interact a lot you are still pretty much on your own (Cooperating teacher to a student teacher, February, 1990).
>
> As Mr. T. said of his best friend in and out of school, Mr. L., "as close as we are, I've never been in any of his classes. I wish he would ask me me sometime, but he never does" (Cusick, 1983, p. 102).
>
> It is my job to encourage all of us to start communicating. We don't often sit down and talk about these things. Drawing upon people's strengths. We need to break the isolation in Science (Joan, Science Support Teacher, interview, March 1988).

These four quotes come from teachers located in different sectors of the profession. They all refer to the isolation of teachers as one of the characteristics of the "trade" that goes by the name of teaching. They also hint at the profound personal and educational costs of that isolation.

We want to address the isolation of Science teachers in a

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(1) For obvious reasons the names of persons and places referred to in this paper were changed.

roundabout way by focusing our discussion on two questions:

1) What happens when science teachers break the isolation and start talking with each other about instructional matters on a frequent basis, and
2) What are some aspects of the school environment that make such conversations possible and fruitful.

II. THE PROFESSIONAL ISOLATION OF TEACHERS IN THE EDUCATIONAL LITERATURE

"Teacher isolation" for the purposes of this paper will mean "professional isolation", that is, teachers' lack of interaction with other professionals about professional matters, namely those having to do directly with teaching and learning. Given this definition, teacher isolation overlaps significantly with "lack of collegial relations".

The situation of teachers being isolated hardly constitutes a new finding in education. Teachers in most situations work alone with their students. During the best part of the day they are isolated from extended contact with other adults. This was inevitable in the one-room schoolhouse and has continued in the multi-room school.

Interestingly enough not much attention has been devoted to teachers' professional isolation as an educational problem. In the sense used in this paper it is absent from the first serious sociological study of the teaching profession done in 1932 (Waller, 1932/1961). Waller refers to the isolation of teachers but in the sense of their isolation from the surrounding community. He does not refer to isolation of teachers in their professional life which suggests that

he did not consider it as a major problem. To be quite fair with Waller's silence let us not forget that one-room schoolhouses "remained numerous in rural areas well into the twentieth century" (Lortie, 1975, p. 14) which made isolation inevitable. Other studies have mostly dealt with teachers' isolation in terms of personal feelings and personal costs (e.g. Katz, 1977). A recent historical study of teaching has a passing reference to teacher isolation as a candidate explanation for the conservatism of the profession (Cuban, 1984, p.244). The silence may be an indication that professional isolation has been one of the characteristics of the profession but was constituted as a problem worthy of study only recently.

In 1953, Howard S. Becker studied the authority relations in the public school system. In that study he refers to the isolation of teachers from each other on professional matters. He says that

> since teachers work in separate rooms and deal with their own groups of parents and pupils, it is hard for another teacher to get the opportunity to break these rules [never questioning other teacher's behavior or decisions], even if she were so inclined. This difficulty is increased by an informal rule against entering another teacher's room while she is teaching (p.73).

Teacher isolation is recognized by Becker as a characteristic of the profession. He offers for it a twofold explanation: 1) physical/architectural constraints (separated rooms) and 2) social constraints. The social constraints are that each teacher has to deal with separate groups of "clients" and that there are informal rules of not interfering with other teachers. As we will see the physical/architectural and the social explanations for teacher

isolation will continue throughout the literature.

Becker (1953) gives much more weight to the informal rules as an explanation for teacher isolation than to physical/architectural constraints. In the sentences following the passage quoted above he makes clear that a teacher only breaks the informal rules with a clearly defined purpose.

> Breaches of these rules are rare and, when they do occur, are usually a kind of punishment aimed at a colleague disliked for exceeding the group work quotas or for more personal reasons (p.73).

The interesting detail to notice is that Becker, in his study, does not seem to have encountered instances of breaking the isolation for pedagogical reasons (e.g. to seek help or discuss a problem).

Another reason for the seeming unbreakability of teacher isolation is suggested by Becker: Teacher isolation serves to reinforce the meager authority of the teacher in the hierarchy of the public school system.

> However, the danger inherent in such an action [going into other teachers' classrooms while they are teaching] - that it may affect your own authority in some way or be employed against you - is so feared that it is seldom used (p. 73).

Paradoxically, teachers' isolation seems to serve as a reinforcer of teacher authority and as a sign of teachers' cooperation with each other.

> It is considered that teachers ought to cooperate to defend themselves against authority attacks and <u>to refrain from directly endangering the authority of another teacher</u> (p.73, emphasis ours).

Summarizing: in Becker's view teachers' professional isolation

seems to stem in part from the physical/architectural conditions of the school but mainly from the social rules of the school. These rules are maintained in order to preserve the authority of teachers. Becker does not seem to consider the isolation of teacher from each other as an educational problem since he does not point to any negative consequences (instructional or other).

In 1968, the problem of teachers' interpersonal relationships within the school was addressed by Miller in a study of the organizational climate of 29 urban schools. The study was designed to ascertain if there was any correlation between organizational climate of the school and student achievement as measured by a standardized test. The organizational climate was defined and measured along nine dimensions. One of those dimensions, Intimacy, referred to teachers' degree of friendliness towards each other. This dimension was positively correlated at a significant level with Language Skills achievement (Miller, 1969).

There are too many problems of validity in the research on school climate (see Anderson, 1982, 1985, for reviews of the research and thorough discussions of the problems associated with it) for us to give much importance to this result. It suggests, however, that the relationships between teachers may have instructional consequences. If simple friendliness may make a difference, we are allowed to wonder what would be the impact of relationships that are not only friendly but also professionally relevant.

The study by Miller (1969) is also an indication that by the end of the sixties the relationships between teachers inside the school

were considered important enough to deserve a place among educational problems.

The Zeitgeist is clearly changed in the late sixties and early seventies with the movement towards "informal education" and "open space schools". With these movements teacher isolation became a pressing problem that needed to be addressed in order to enhance school learning. We could say that teacher isolation as an educational problem seems to have cristallized in the literature around the late sixties and early seventies in part due to these reform movements.

Silberman (1970) one of the proponents of the informal education/open school concept refers to isolation as a central problem in teachers' professional life.

> Despite the continuous contact with children, moreover, teaching is a lonely profession. Teachers rarely get a chance to discuss their problems or their successes with their colleagues, nor do they, as a rule, receive any kind of meaningful help from their supervisors, not even in the first year of teaching (p. 144, emphasis ours).

He does not clearly state any explanation of why teachers are isolated. The quote above is part of a description of teachers work conditions. A few pages before he speaks of two major influences on the quality of teachers' life in schools: physical environment and intitutional work demands.

> Teachers rarely have offices of their own, and if there is a teachers' lounge, more often than not it is a shabily furnished room designed to permit no more than a fast smoke (p. 142-143, emphasis ours)

> And there are the conditions of work themselves: teaching loads that provide no time for reflection or privacy, and menial tasks such as "patrol duty" in the halls or cafeteria that demean or deny professional

status (p. 143, emphasis ours).

Neither the physical nor the institutional environment are conducive to teachers having extended and fruitful conversations with each other on any topic.

A few paragraphs before, Silberman suggests that if the conditions of teaching are substantially changed then teachers' ways of teaching and the relations with their colleagues will change too.

> But teachers <u>are</u> human. [...] Most teachers are decent, honest, well intentioned people who do their best under the most trying circumstances. If they appear otherwise, it is because the institution in which they are engulfed demands it of them. [...] If placed in an atmosphere of freedom and trust, if treated as professionals and as people of worth, teachers behave like the caring, concerned people they would like to be. They, no less than their students, are victimized by the way in which schools are currently organized and run (p. 142, emphasis in the original).

Heath (1971) is another proponent of the "open school movement" and in his book <u>Humanizing Schools</u> he makes explicit proposals to tranform schools into places of learning. One of the conditions he deems indispensable for what he calls "an educative atmosphere" is shared purposes. "Neither a small school nor clarity of purpose makes an educative atmosphere if there is no intercommunion of purpose among the people in the school" (p. 130). In order to create this intercommunion of purpose he proposes to break with teachers' isolation

> Create patterns that stimulate meaningful communication. A faculty lounge where coffee is served and chit-chat occurs is not enough. Don't expect intercommunion to result from a typical faculty meeting, in-service training program, or a committee charged to decide "Our Goals for the School." Concepts and abstractions frequently distort what we actually do. They get in the way of understanding <u>until</u> we have shared some common experience or action together.

Breaking isolation means for Heath more than removing physical barriers, it means to create the time, place, willingness and substance of the conversation.

> So develop structures that enable faculty to work together on the problems of a boy like Billy, for example. Help teachers share their feelings of inadequacy and despair because they can't reach every kid in their classes. Create a regular consultation period during which teachers get together to discuss specific children. Find ways to help Billy's teacher talk with his gym teacher. Better yet, encourage them to observe how each works with chidren. Create ways in which teachers can work cooperatively together with Billy and the other children - and then reflect about what they did. Make the educability of Billy the focal point of the communication (p. 131, emphasis in the original).

Summarizing, we can say that the late sixties early seventies brought teacher isolation to the forefront as a problem in schools. Teacher isolation was seen as a composite of architectural barriers, institutional demands, lack of opportunity and lack of substance all working against the possibility of meaningful interactions among teachers. One of the fundamental underpinnings of the movement was the breaking of teacher isolation. The sad fact was that most of the implementations were confined to removing architectural barriers and leave all the social-institutional ones untouched. The failure of the open school to break with teacher isolation, if nothing else, shows that addressing a complex problem by changing one of the aspects will get us nowhere.

The middle of the seventies saw the publication of Lortie's Schoolteacher (1975) which the author intended as a sociological study of the profession. The extent to which Lortie treats teacher isolation

and achieves the crystallization of the problem, studies of the profession have to refer to teachers' isolation in Lortie's terms. The subsequent literature also does not add anything new to what Lortie had to say and worst even does not challenge his premises, evidence or conclusions.

Lortie sees the isolation of teachers as a constant feature of the profession throughout the historical development of schools in the U.S..

> Colonial teachers were employed in separate establishments dispersed throughout settlements which were in turn distributed over extensive and sparsely populated territory. Most teachers must have gone without association with other teachers for long periods of time, except perhaps in a few large communities like Boston. Each teacher, moreover, spent his teaching day isolated from other adults; the initial pattern of school distribution represented a series of "cells" that were construed as self-sufficient (p. 14).

The isolation continued to be the norm in the multiple-room school despite the physical proximity of teachers.

> The creation of schools composed of multiple distinct classrooms, however, did not result in a sharp increase in task interdependence among teachers, since individual teachers either taught all subjects to a particular group for a year or, as later developed in the higher grades, taught a single subject to the same group for a stipulated period of time. [...] Teachers' work in short, was not radically altered by the development of the multiple unit school. [...] As before, the teacher continued to work largely alone with particular students... (p. 14).

The "feminization" of the profession brought the adaptation of teachers' careers to the demands of raising a family traditionally entrusted to women. Women are the ones that have to interrupt their career if need be. These interruptions create discontinuities that

reinforce teacher isolation by weakening the ties among the members of the occupation and depreciating the status of the task of teaching. They also contribute for the weak rewards of the profession.

> Such discontinuities weaken the solidarity of the occupation [...]; they may be major obstacles to more effective collegial relationships among teachers (p. 100).

In these texts Lortie weaves together four lines of explanation for teacher isolation: 1) the historical conditions of the development from the one-room school to the multiple-room school, 2) the institutional organization that assumed and reinforced the separation, 3) the "feminization" of the profession that created discontinuities on the professional career of a significant number of teachers and 4) the constant presence of architectural barriers. In order to make full justice to Lortie's treatment of teacher isolation, none of these is to be seen as a main cause. As a matter of fact he treats them as working in a complex structure of mutual reinforcement. Teacher isolation according to Lortie is not only effect of these structural complexes but also an integrating part of them.

> Throughout the long, formative decades of the modern school system, schools were organized around teacher separation rather than teacher interdependence.

The organization of schools around teacher separation reinforced that separation and had all kinds of consequences that in their turn assumed and reinforced the separation from which they stemmed. Lortie talks about curricular consequences and consequences for the ways schools and teachers comwe to view children's learning and development.

> Curricula assumed such mutual separation and served

> coordinating functions by aligning the contributions of teachers in different grades and subjects to student development. Elementary education came to be seen as a matter of accretion - of serial learning in particular subjects. Secondary schooling, on the other hand, would mix notions of serial learning and contemporaneous study of different subjects. This type of organization meant that each teacher was assigned specific areas of responsibility and was expected to teach the students the stipulated knowledge and skills without assistance from others. The pattern so developed remains dominant today, although there are increasing types and amounts of deviation from it. [...] The single cell of instruction has played a key role in the development of the American public school; like any persistent feature of a social system, it became interconnected with other parts of that system (pp. 14-15)

Along with these curricular and organizational consequences, Lortie points out the effects that teacher isolation has in the induction of new teachers into the profession.

> But the cellular organization of schools constrains the amount and type of interchange possible; beginning teachers spend most of their time physically apart from colleagues (p. 72).

> Because of this isolation the beginning teacher frequently works things out as best as he can before asking for assistance (p. 73).

Beginning teachers are socialized in isolation and into isolation. This pattern of socialization is a consequence of teacher isolation and in turn breeds it in the new generations of the profession.

One of the most important consequences of teacher isolation is, for Lortie, the absence of a shared technical culture among teachers.

> Teaching is not like crafts and professions, whose members talk a language specific to them and their work. Thus the absence of a common technical vocabulary limits a beginner's ability to "tap into" a preexisting body of practical knowledge. Without such a framework, the neophyte is less able to order the flux and color of daily events and can miss crucial transactions which might otherwise be encoded in the categories of a

> developed discourse. Each teacher must laboriously construct ways of perceiving and interpreting what is significant. That is one of the costs of the mutual isolation that attends the absence of a common technical culture (p. 73, emphasis ours).

This absence not only stems from the isolated character of the profession but also tends to reinforce it. Teacher do not interact with each other on professional matters for lack of a professionally relevant discourse.

Teacher isolation besides curricular, organizational, and technical consequences has also influenced the structure of the profession.

> It does not seem surprising, in this light [independence of effort by teachers and high turnover], that the division of labor selected was based on gross characteristics such as age and subject matter and that coordination was minimized by assigning tasks so that each teacher worked for long periods of time without heavy interaction with colleagues (p. 16).

Teacher isolation seems to be one of the reasons for the weakness of teachers' associations, both labor and professional in face of all the powerful lobbies that assault education at any time.

The isolation of teachers is seen by Lortie as also constraining the flow of pedagogical information. Even when teachers exchange information on professional matters that information is screened through a highly individualistic and pragmatic framework.

> Teachers are portrayed [in a group of interviews] as an aggregate of persons each assembling practices consistent with his experience and peculiar personality. It is not what "we the colleagues" know and share which is paramount, but rather what I have learned through experience (p. 79, emphasis in the original).

Summarizing: Lortie views teacher isolation as a complex socio-

historical phenomenon with mostly negative consequences both on the individual teachers and on the profession itself. His analysis has the strength of going beyond the architectural explanations and the weakness of sometimes seeming to "blame the victim". There is one very important characteristic of Lortie's analysis: the complex interconnectedness of teacher isolation with the historical development of the profession and the "culture" of schools. The notion of a single or even multiple causal factors looses meaning. If we want to speak of causality in connection with teacher isolation we must drop linear chains causation in favor of webs of multiple cause-effect links (for a thorough discussion of causality as a web of relations see Hanson, 1965). Teacher isolation can be better understood as cause and effect in a complex system of feedback relationships.

In the last chapter of the book Lortie offers some suggestions to change the pattern of teacher isolation.

> Opportunities for mutual consultation are limited during the working day, and contacts between teachers are peripheral to their major obligations. Much could be done to encourage mutual involvement in teaching affairs short of requiring that teachers share the actual instruction of students (p. 232).

He then goes on to suggest four possibilities: 1) Teachers meet with each other to solve a student's problem,

> Arrangements could be made to "conference" individual students and bring various specialist observations to bear [..] (p. 232).

2) Teachers observe other teachers,

> Time could be set aside to have teachers observe special lessons taught by peeres and visitors (p. 232).

3) Teachers exchange classes in order to widen their experience, and

> Exchange of classes could be encouraged on a school- and system-wide basis [...] (p. 232).

4) Teachers exchange observations and reflections

> [...] time could be set aside for exchange teachers to compare their observations on class and individual phenomena (p. 232).

The effects of all this would be to "reduce the intellectual narrowness induced by mutual isolation and to foster close exchange among faculty members" (p. 232). Importantly enough the conservatism of the profession would be seriously shaken because it "is less readily sustained when people confront others who do things differently but well" (p. 232).

In the end of the seventies a group of researchers conducted an extensive study of schooling in the U.S.. The results of this study are summarized and interpreted in Goodlad's book A Place Called School (1983). As we could expect he characterizes the teachers' job as being done in isolation.

> The teachers in our sample had some associations with others in college courses, inservice classes and workshops, and meetings of educational organizations, but rather brief and casual kinds of associations. They rather rarely joined with peers in collaborative endeavors such as district committees or projects. Nor did they visit other schools or receive visitors from them very often. There was little in our data to suggest active, ongoing exchanges of ideas and practices across schools, between groups of teachers, or between individuals even in the same schools. Teachers rarely worked together on schoolwide problems (p. 187, emphasis ours).

Not only were the teachers not involved in schoolwide tasks they were not involved in interaction about their own teaching and their students' learning.

> Inside schools, teacher-to-teacher links for mutual assistance in teaching or collaborative school improvement were weak or nonexistent, especially in the senior high schools. Most teachers taught alone in a classroom. A large majority said that they never observed instruction in other classrooms. Those who did said that they observed only once or twice a year (pp. 187-188, emphasis ours).

Curiously enough, Goodlad points out that the isolation does not seem to be wanted by the teachers themselves. Teachers would like to interact and communicate on a professional level.

> But approximately three quarters of our sample at all levels of schooling indicated that they would like to observe other teachers at work. In general teachers themselves perceived their awareness of one another, communication, and mutual assistance not to be strong (p. 188, emphasis ours).

The explanation that Goodlad offers is centered on the institutional characteristics of schools.

> The very nature and conduct of the schooling enterprise appear to operate against the concept of principals, teachers, parents, and perhaps students working together on schoolwide problems. If the schools of our sample are representative, there are not infrastructures designed to encourage or support either communication among teachers in improving their teaching or collaboration in attacking schoolwide problems (p. 188, emphasis ours).

The school as an institution seems to work against the collegiality of teachers by simple lack of the needed structures.

In order to change this situation, Goodlad advocates changes in the allocation of time and rewards, in teachers' perceptions of their role, and in teachers' preparation.

> It will require more than exhortation to change this situation. Improvement of those circumstances that transcend individual classrooms no doubt will require the allocation of time and rewards for nonteaching

> activities, a differing perception of responsibility on the part of the teachers, and job preparation beyond pedagogy and classroom management. To date this proposition has been largely ignored by those seeking to improve schools through interventions from without (p. 188, emphasis ours).

Lortie's book was based on the responses of teachers to extensive interviews and Goodlad relied mainly on survey data and data from secondary sources. They both included in their data base very little (if any) observation of teachers during their daily school lives. Their claims could be if not dismissed at least weakened by saying that neither author portrays the "real" life of teachers in schools. The truth of the matter is that Cusick (1983) reports much the same findings based on three ethnographic studies he conducted in high schools.

> As Mr. T. said of his best friend in and out of school, Mr. L., "as close as we are, I've never been in any of his classes. I wish he would ask me me sometime, but he never does". It is not that the teachers never discussed teaching or students. They did, but never in a way that suggested that they were either seeking advice or consensus on how to approach their classes. There was consensus of a sort, but it centered on the common agreement that what one did was her or his own business and others did not have the right to either publicly criticize or offer advice (p. 102, emphasis ours).

The late seventies and the eighties saw several calls for reform of U.S. schools being made. Many groups with differing orientations responded to those calls diagnosing the problems and advocating solutions. One such groups has been called "effective schools/exemplary schools". The vision of the problems and solutions espoused by this group stems mainly from an administrativist conception of schools and education and from the results of experimental,

quantitative educational research. The insistence is on ways of tightening the controls of educational productivity. The literature produced by this movement and its avatars is impressive by its quantity but not very enlightening about the problem we are studying.

A book about research on exemplary schools (Austin & Garber, 1985) has a long chapter about the principal but none about teachers. The chapter about teaching despite its aspect is not about teachers. The chapter about school climate in this book dedicates a total of 5 lines to the contribution of teacher-teacher relationships to the overall climate of the school (Anderson, 1985).

> Teacher-teacher relationships and socializing among teachers are both strongly related to school climate and to student achievement (H. E. Miller, 1969; Phi Delta Kappa, 1980; Rutter et al., 1979; Wynne 1980). These studies have characterized this variable as including cooperation, concern, and friendliness among faculty (p. 107).

This paragraph reiterates what the author had said in an earlier and extensive review about school climate (Anderson, 1982, p. 401). In the same review Anderson (1982) adds a little evidence about the importance of "teacher shared decision-making".

> Several studies have also pointed out the importance of staff participation and leadership in decision-making. In a study of teacher and student perceptions of school climate, Ellett and Walberg (1979) found a relationship between staff participation and student achievement. Group decision-making was related to achievement in the Rutter et al. study (1979) and to coherence in Wynne's (1980) observational research in schools. Similarly, the Phi Delta Kappa study discovered a consistent pattern of staff involvement in decision-making in high-achieving elementary schools, along with high consideration given to teachers by the administration (p. 400, emphasis ours).

The Miller (1969) study, already discussed (see p. above) found a significant correlation between teachers' degree of friendliness towards each other and students' Language skills achievement.

The Phi Delta Kappa study does not present much evidence to help us clarify the question of teacher isolation. Most of the study is concerned with the role of the principal and variables associated with school resources and time to teach. None of these are important for our purposes despite the fact that they are important and instructive in themselves. David L. Clark (1980) in the same book reviews forty studies of effectiveness of urban elementary schools. In his conclusions he states that "there are strong clues if not compelling evidence to support that teachers in successful schools and programs seem to have more opportunity for interchange of ideas and more time for joint planning" (p. 178).

Rutter et al. (1979) in their study of secondary schools in Britain refer to teacher-teacher relationships as influencing the morale of the teachers and in that way influencing the students achievement. The inference is presented as plausible based on studies of other service professions not on their own findings.

> We did not study the personal relationships between staff or their own satisfactions in their teaching role or their contentment with conditions in the particular school at which they taught. However, studies of hospitals (both general and psychiatric) suggest that patients suffer when staff morale is low [references to three studies]. Doubtless, too, pupils are likely to make less satisfactory progress when teaching staff are discontented or in conflict (pp. 193-194, emphasis ours).

Two interesting findings of this study help further our purpose of

clarifying the meaning and consequences of teacher isolation. THe first finding concerning teachers' joint planning of curriculum is somewhat disappointing.

> The teachers in the schools which were more successful in terms of good attendance and low delinquency were much less likely to report that they had absolute freedom in planning their course. In these schools, planning was a group matter, generally based on departments, with the head of department both monitoring and advising on the department's curriculum planning. In the less successful schools, teachers worked on their own to a much greater extent, with the consequence that often there was little coordination between teachers in the same department (pp. 112-113, emphases ours).

If joint planning had any effect on student achievement it was indirectly by removing obstacles (low attendance and delinquency) to academic pursuits. On the other hand we are not informed of the substance of this joint planning which could cast some light on the results.

The second finding is that the way decisions were made in the schools had a significant effect on student achievement.

> We asked the teachers in each of the schools where they felt that the decisions in their school were made. In the majority of schools most teachers said that decisions were taken at senior staff level - but the proportions per school varied from 33 per cent to 100 per cent. Schools with good outcomes tended to be agreed that decisions were made at senior staff level rather than in the staff room.
>
> On the other hand, when asked whether their own views were taken into account at the appropriate decision-making level the teachers in the less successful schools tended to state that they felt that their views were not represented (p. 138, emphasis ours).

Wynne's book, Looking at Schools (1980) provides little more evidence. He devotes two pages to the relationships among faculty. In

these he seems to imply that "good" schools have a faculty that maintains a high level of socializing. There is no reference to interactions among teachers that have professional content (e.g. joint planning). The absence may be due to the inexistente of those contacts in most schools.

Summarizing, the research in exemplary/effective schools suggests the following conclusions: Teacher isolation may affect the morale of teachers and by that hinder student progress; teachers' joint curriculum planning does not seem to affect student achievement directly but only (possibly) by improving the learning climate of the school; and the representation of teachers' views in the school decision-making and teacher shared decision-making have effects in the students' achievement. The evidence is not strong and the findings somewhat disappointing but they do warrant the claim that teacher isolation has definite negative consequences on student learning.

IV. ISOLATION: SCIENCE TEACHERS ARE NO EXCEPTION

Gallagher (1986) studied secondary science teachers in 5 schools and found the pattern of isolation in three schools similart to that noted by Lortie. The lack of dialogue in three schools seemed to be a result of physical and temporal barriers. Science teachers had no time or opportunity to meet. In the other schools some, but not all, of the science teachers in each department were close colleagues who interacted daily over many matters. These teachers met for lunch and shared free periods and discussed sports, politics, jokes, difficult students and the administration but they virtually never discussed

teaching and learning or how they might be more effective in helping students value and understand science better. Two teachers in each department differed from this pattern. Two seventh grade science teachers shared demonstrations and lab exercises. Their conversations about the labs tended to be rather telegraphic and focused on techniques to make the labs "work," but they rarely talked about how the labe could be helpful in engendering students' learning. Two physics teachers in a high school science department had a very different kind of dialogue that had extended for several years at the time of the study. These two were unique in one study of thirty teachers since they conversed about student learning, subject matter organization and sequencing, and the effects of their actions in learning.

While the two physics teachers shared their professional knowledge at a high level of detail and depth, most others in the department were not engaged in the discourse on a regular basis because the interaction focused quite specifically on physics. Moreover, these two did not influence the climate of the department, even though one was serving as the science department chair in that school.

In junior high schools where discourse among teachers was frequent, the architectural and organizational barriers referred to by Lortie (1975) were not deterrents to interaction. Teachers ate together and shared time in common planning periods and before and after school. The departmental head's coffepot was one attractant. He maintained a coffee pot in his room and teachers came for coffee before, during, and after school. He also was very friendly and

supportive with frequent jokes to tell his colleagues when they came by which was frequent. Teachers even came during class; it was common for one or more teachers to tip-toe across the back of the classroom and into the preparation room for coffee.

However, in spite of the circumventing of physical and organizational barriers, why was virtually none of the discourse about teaching and learning? We believe that there are two reasons. First was privacy alluded to by Becker (1953). These colleagues were reluctant to talk about their own teaching and to "pry into" their peers teaching because it would violate an unstated norm of privacy. Second, and we believe equally or more important, the teachers did not share a common language and concepts to talk productively with each other about teaching and learning. (Many people have offered a third reason which we discount - That teachers do not talk about teaching and learning because they elect to use <u>their</u> time to "recharge" after having had students with them all day. That does not appear to be a sound reason, because teachers frequently talk about troublesome students and other school matters.)

As a consequence of our conjecture regarding the norm of privacy we set out to understand what will occur if we (a) altered the intitutional organization (b) overcame, or at least side stepped, the architectural barriers, (c) modified the norm of privacy by encouraging and rewarding teachers for entering and observing each others' classes and (d) provided teachers with a new knowledge base that will allow them to talk with ease about teaching and learning in productive ways.

V. OVERVIEW AND SUMMARY ABOUT TEACHER ISOLATION

Purpose and Plan

Can the cirle of lack of professional discourse and isolation be broken? We believe that it can by providing teachers with (1) the language and concepts that will permit them to talk with peers productively about teaching and learning and (2) the time and circumstances that will allow it. Therefore, the purpose of the research reported here is to examine what occurs when teachers are given both the tools and the context that will permit frequent interactions about teaching and learning. More specifically, what concepts and language are of use to teachers in conducting productive discourse about teaching and learning, and what contextual conditions nurture this discourse?

VI. SCIENCE AND MATHEMATICS SUPPORT TEACHER PROGRAM: ASSUMPTIONS AND DEVELOPMENT

The study reported is part of a larger collaborative research and intervention project in junior high school science and mathematics. The project aims at improving the instruction in these subject areas and at the same time study the conditions and processes of that improvement. One of the approaches chosen was to create in the school conditions for extended professional interaction among the teachers. Previous research had led the project staff to believe this to be a crucial condition for the improvement of instruction (Gallagher, 1989). In order to achieve this goal a collaboration project among a university based research institute, a school district, and a teachers' union was arranged. Four junior high schools in an urban midwestern

school district agreed to participate in the project. In each of them, the science and mathematics faculty chose on of their members to be respectively the Science and the Mathematics Support Teacher. The study only deals with data pertaining to the four science support teachers.

The project, now in its third year, centers on the role of Science or Mathematics Support Teacher as the institutional way to "start the conversation." The support teachers have half of their time assigned to work with other teachers in the improvement of instruction. Support teachers observe other teachers as they teach and give them feedback about their instruction. Other activities are: formal and informal contacts with the the science teachers, the conduct of departmental meetings, and the study of educational literature. At the same time the support teachers work on the improvement of their own instruction (Bettencourt & Gallagher, 1989; Gallagher, 1989). These activities generate frequent opportunities for the teachers to engage in professional conversation. At the same time the conversation generates the need for new opportunities to meet and work together.

The project staff is composed of two university researchers (one science educator, the other mathematics educator), a teacher consultant and a graduate assistant. They were responsible for the training of the support teachers which lasted for about ten months and continued to give them technical assistance which continued from December 1988 to the present. (For further detail on technical assistance see Gallagher, 1989.)

During both the training and the technical assistance phases

extensive documentation has been kept on the support teachers' own teaching practice, their implementation of the new role, and the other teachers' perceptions about and response to, the project. The date pool from which this study selected materials includes: inventories about teaching practice, structured interviews, fieldnotes of classroom observations, training meetings, and feedback sessions, transcripts of feedback sessions, audiotapes and videotapes of classes and feedback sessions, notes on the school and department climate, support teacher logs of their activities, departmental meeting agendas and notes, traces of student work like worksheets, test, write-ups, etc.. It is from this extensive database that we draw our results These data were collected by the project staff, the support teachers themselves, and four external observers that spent extended periods in each of the four schools. Data are still pouring into the project files and so the findings reported here are preliminary and their analysis exploratory.

VII. CHANGING THE CONVERSATION:

THE EXPERIENCE OF THE SUPPORT TEACHER PROGRAM

Findings

Our data show that the project has had a desirable effect on both the nature and the amount of discourse among teachers in each of the four science departments. First, teachers now are in possession of new knowledge based on findings from educational research on the teaching and learning of science conducted during the past 15 years. THey have learned about research on students' alternative conceptions, cooperative group learning, and writing as an aid to understanding.

They have been apprised of new views of the learning process including constructivism. Second, many teachers have formulated a new "vision" of what it means to teach and to learn which has been engendered by the acquisition of this new knowledge base. This new vision about teaching and learning includes (a) appreciation of the significance of students' level of knowledge (including alternative conceptions) to further learning (b) that students must restructure their thinking about the concepts taught if learning is to occur and (c) that teachers' can positively effect a larger percentage of students if they use more effective teaching strategies. Third, many teachers are dissastisfied with the approaches to teaching which they have used for years, and they are now struggling to align their vision and their practice.

These three changes have had a significant influence on the discourse among the teachers in the department. Departmental meetings now focus on deepening the understanding and sharpening skills for techniques such as concept mapping and cooperative group work, as teachers work to bring their teaching in line with what they blieve is possible. teachers talk about students' concepts and ways of diagnosing their alteranative conceptions. Teachers are even beginning to discuss how teachers must change strategies so that students will have the needed conditions to construct their own meanings or "make sense" for themselves.

Teachers meet frequently with the support teachers, individually or in pairs, to discuss these same topics informally. Conversation before and after school and at lunch time now tends toward how to help students understand specific topics or how to use a particular

technique to achieve a desired objective; whereas two years ago, informal conversations tended to focus on the deficiencies and disruptive students. Now a more positive tone prevails: Instead of, "Why aren't these students motivated?" the question is more apt to be " What can I do to help these students understand and value the subject matter I'm trying to teach?"

Teachers still complain and some still are resistant. A few teachers see the support teachers as having all the advantages - fewer classes and more time for planning. Some say, "I would do better, too, if I had only three classes per day instead of six." A few teachers, to be specific one in each school, resent the intrusion of the support teacher into their classes to observe and some are reluctant to give their planning period for a feedback session. However, most teachers view their support teacher without jealousy and see her/him as a resource that can help with new ideas and techniques that improve their effectiveness.

While the process of improving the nature and amount of discourse among teachers about teaching and learning is slow, it appears to be possible. Obviously, the organizational and architectural barriers to discourse are important and need to removed as Lortie (1975) indicates. However, the study shows that changing teachers' knowledge and "vision" about teaching and learning are essential elements to productive dialogue among teachers. In earlier studies, Gallagher (1986, 1989)

showed that many secondary science teachers hold the view of their role as "a presenter of scientific information to students." These teachers frequently defined their position with an added statement,

> My job is to, present the information, the students' job is to learn it, the good students will do it and the rest won't.

The foregoing statement also implies that some (or many) students are not capable or sufficiently motivated to learn science, but these students' failure is beyond the province of teaching. With most of the teachers in the support teacher Program, the vision of teaching represented above has been replaced by one which examines reasons why students are not learning , explores strategies for helping students to learn, and gives at least some responsibility for student learning to the teacher. This change in vision appears to be a consequence of new knowledge from research on teaching and learning. Both the change in vision and the new knowledge about teaching and learning, with its accompanying vocabulary, appear to be essential to the increased discourse we found among these teachers. It is as if the new vision gives them a reason to talk and the new knowledge supplies the content.

Thus in contrast to both Silberman (1970) and Lortie (1975) we have found that improved discourse about teaching and learning requires more than changing the nature of the milieu in which teachers work. It also requires a change in teachers knowledge about, and their vision of teaching and learning.

Observation and feedback also have enhanced the discourse among teachers. This discourse has been dyadic in format, for the most part

as support teachers meet with teachers in feedback sessions to discuss observations made in lessons. While some discussion of these feedback sessions has engaged friends and confidents of the teacher observed, the greatest benefits to increased discourse has resulted from (1) the practice in using new concepts and terminology in private conversations between each support teacher and her/his colleagues and (2) the application of these new concepts and terms by each teacher to their own teaching.

It is instructing to note that a few teachers have not entered into meaningful discourse on teaching and learning with their peers and the support teacher. These resistant teachers appear to be fearful of the intrusion on their privacy as indicated by Becker (1953). Some of these teachers are satisfied with their current effectiveness and they may be fearful of the imposition by the support teacher of a need for change for the sake of change. Other resistant teachers may fear observation and discourse about teaching and learning because they recognize their own ineffectiveness and would prefer not to address it. Instead, they would rather place the responsibility for learning on students rather than share it with them.

Summary

Science support teachers' activity in the four schools has resulted in more and different conversation about science instruction both formally and informally. Observation and feedback gave the opportunity for science teachers to share suggestions and jointly solve instructional problems. The support teachers' suggestions also gave

the opportunity for the conversation to continue later as teachers asked each other about their teaching and feedback sessions.

Departmental meetings evolved from a procedural focus to become centered on instructional and curricular matters. Teachers in the four schools started talking about and experimenting with group work, teaching for understanding, concept mapping and in-class writing tasks to enrich and appraise students' learning. They started experimenting with different and creative ways of assessing students' understanding (e. g. writing tasks, complex problem situations, debates, etc.). Exchange of ideas, materials, and concerns became part of the interaction among science teachers.

Further, the Science support teachers initiated the conversation that was at the base of instructional improvements, experimentation, and a burgeoning collegial climate. At the same time, all these events fed into the conversation to enrich it and keep it going. None of this was done without problems and resistance. In each school there is at least one science teacher that is still in the priphery of the conversation. Others are making differential progress that appears to depend on (a) the amount of new knowledge they have acquired and (b) their new "vision" of teaching and learning. THe amount of new knowledge a teacher acquires appears to be directly related to the degree of change of vision; and the amount of change of vision is related to each teachers' need for, and ability to engage in, discourse about teaching and learning with peers and the support teacher.

VIII. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This study indicates that teacher isolation is neither inevitable nor unchangeable. Teachers can and given the opportunity do converse about instruction. The approach to breaking teacher isolation seems to work better if it is school based and done by teachers themselves with external help. There also needs to be administrative support (e.g scheduling to reduce organizational barriers) for the transformation to be successful. Finally the process takes time. There are no quick fixes. We are in the third year we still have long ways to go in each of the four schools before we (researchers and support teachers) feel that our efforts will be both self-sustaining and effetive with most of the teachers.

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